

WHAT IS CLAIMED IS:

1. A rigid and strong deep dish disposable container prepared from a radially scored, substantially planar paperboard blank, the container having a substantially planar bottom portion, an upwardly extending sidewall portion and an outwardly extending flange portion, at least one of said upwardly extending sidewall portions and said outwardly extending flange portions being provided with a plurality of circumferentially spaced radially extending densified regions formed from a plurality of paperboard layers reformed into substantially integrated fibrous structures generally inseparable into their constituent layers having a thickness generally equal to adjacent areas of the sidewall or flange portions, said deep dish disposable container being provided with a height to diameter ratio of from about 0.1 to about 0.16 and a characteristic flange width to diameter ratio of at least about 0.04 and wherein said densified regions extend over a profile distance corresponding to at least a portion of the length of the scores of the paperboard blank from which said container is formed.
2. The deep dish disposable container according to Claim 1, wherein said densified regions extend over a profile distance corresponding to at least about 50 percent of the length of the scores from which the container is formed.
3. The deep dish disposable container according to Claim 2, wherein said densified regions extend over a profile distance corresponding to at least about 75 percent of the length of the scores from which the container is formed.
4. The deep dish disposable container according to Claim 1, wherein said container further comprises a lip portion joined to said flange portion and extending downwardly therefrom.

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$$H/D = 0.1 - 0.16$$

$$(X_1 - X_2)/D = 0.04$$

$$H/D = 0.1 \sim 0.16$$

5. The deep dish disposable container according to Claim 1, wherein said plurality of circumferentially spaced radially extending densified regions are formed from 2 to 3 layers of paperboard reformed into substantially integrated fibrous structures with a thickness generally equal to adjacent areas of the sidewall or flange portions.

6. The deep dish disposable container according to Claim 5, wherein said plurality of circumferentially spaced radially extending densified regions are formed from 2 up to a maximum of 3 layers of paperboard reformed into substantially integrated fibrous structures with a thickness generally equal to adjacent areas of the sidewall or flange portions.

7. The deep dish disposable container according to Claim 1, wherein said radially scored paperboard blank has from about 50 to about 100 radial scores.

8. The deep dish disposable container according to Claim 7, wherein said radially scored paperboard blank has from about 60 to about 90 radial scores.

9. The deep dish disposable container according to Claim 8, wherein said radially scored paperboard blank has about 75 radial scores.

10. The deep dish disposable container according to Claim 7, wherein the scores of said radially scored paperboard blank have a width of from about 0.01 inches to about 0.05 inches.

11. The deep dish disposable container according to Claim 8, wherein the scores of said radially scored paperboard blank have a width of about 0.03 inches.

12. The deep dish disposable container according to Claim 1 wherein said container has from about 0.015 inches to about 0.05 inches excess paperboard per score about said flange portion.
13. The deep dish disposable container according to Claim 12, wherein said container has from about 0.025 inches to about 0.04 inches excess paperboard per score about said flange portion.
14. The deep dish disposable container according to Claim 1, wherein said container has from about 50 percent to about 175 percent excess paperboard per score about said flange portion.
15. The deep dish disposable container according to Claim 14, wherein said container has from about 90 percent to about 140 percent excess paperboard per score about said flange portion.
16. The deep dish disposable container according to Claim 15, wherein said container has about 100 percent excess paperboard per score about said flange portion.
17. The deep dish disposable container according to Claim 1, wherein said deep dish disposable container has a height to diameter ratio of from about 0.125 to about 0.135.
18. The deep dish disposable container according to Claim 1, wherein the scores in the paperboard blank extend from the upper portion of the sidewall downwardly over at least about 75 percent of the height of the sidewall and terminate at a level substantially above said substantially planar bottom portion of said deep dish disposable container.

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19. The deep dish disposable container according to Claim 1, wherein the characteristic flange width to diameter ratio is from about 0.04 to about 0.12.

20. The deep dish disposable container according to Claim 1, wherein the characteristic flange width to diameter ratio is at least about 0.05.

21. The deep dish disposable container according to Claim 1, wherein said paperboard blank is provided with a substantially liquid-impervious coating comprising an inorganic pigment and a water-based, press-applied overcoat.

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22. A rigid and strong deep dish disposable container prepared from a radially scored, substantially planar paperboard blank, at least one surface of said paperboard blank bearing a substantially liquid-impervious coating comprising an inorganic pigment and a water-based, press-applied overcoat, the container having a substantially planar bottom portion, an upwardly extending sidewall portion, an outwardly extending flange portion, and a lip downwardly extending therefrom, at least one of said upwardly extending sidewall portions and said outwardly extending flange portions being provided with a plurality of circumferentially spaced radially extending densified regions formed from two to three layers of paperboard reformed into substantially integrated fibrous structures generally inseparable into their constituent layers having a thickness generally equal to adjacent areas of the sidewall or flange portions, wherein the ratio of the height to diameter of said container is from at least about 0.1 to about 0.16, the ratio of the length of said downwardly extending lip to the diameter of said deep dish disposable container is from about 0.010 to about 0.030 and wherein said densified regions extend over a profile distance corresponding to at least a portion of the length of the scores of the paperboard blank from which said container is formed.

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23. The deep dish disposable container according to Claim 22, wherein said densified regions extend over a profile distance corresponding to at least about 50 percent of the length of the scores from which the container is formed.
- 5 24. The deep dish disposable container according to Claim 23, wherein said densified regions extend over a profile distance corresponding to at least about 75 percent of the length of the scores from which the container is formed.
- 10 25. The deep dish disposable container according to Claim 22, wherein said container further comprises a lip portion joined to said flange portion and extending downwardly therefrom.
- 15 26. The deep dish disposable container according to Claim 22, wherein said plurality of circumferentially spaced radially extending densified regions are formed from 2 up to a maximum of 3 layers of paperboard in some portions reformed into substantially integrated fibrous structures with a thickness generally equal to adjacent areas of the sidewall or flange portions.
- 20 27. The deep dish disposable container according to Claim 22, wherein said radially scored paperboard blank has from about 50 to about 100 radial scores.
28. The deep dish disposable container according to Claim 27, wherein said radially scored paperboard blank has from about 60 to about 90 radial scores.
- 25 29. The deep dish disposable container according to Claim 28, wherein said radially scored paperboard blank has about 75 radial scores.

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30. The deep dish disposable container according to Claim 27, wherein the scores of said radially scored paperboard blank have a width of from about 0.01 inches to about 0.05 inches.

5 31. The deep dish disposable container according to Claim 30, wherein the scores of said radially scored paperboard blank have a width of about 0.03 inches.

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32. The deep dish disposable container according to Claim 27 wherein said container has from about 0.015 inches to about 0.05 inches excess paperboard per score about said flange portion.

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33. The deep dish disposable container according to Claim 32, wherein said container has from about 0.025 inches to about 0.04 inches excess paperboard per score about said flange portion.

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34. The deep dish disposable container according to Claim 22, wherein said container has from about 50 percent to about 175 percent excess paperboard per score about said flange portion.

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35. The deep dish disposable container according to Claim 34, wherein said container has from about 90 percent to about 140 percent excess paperboard per score about said flange portion.

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36. The deep dish disposable container according to Claim 35, wherein said container has about 100 percent excess paperboard per score about said flange portion.

37. The deep dish disposable container according to Claim 22, wherein said deep dish disposable container has a height to diameter ratio of from about 0.125 to about 0.135.

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39. A method of making a deep dish disposable container comprising:

- a) preparing a radially scored, substantially planar, paperboard blank having from about 50 to about 100 scores provided with score widths of from about 0.01 inches to about 0.05 inches;
- b) positioning said radially scored paperboard blank in a heated pressware die set;
- c) heat-pressing said radially scored paperboard blank with said die set into said deep dish container wherein said deep dish disposable container has a substantially planar bottom portion and upwardly extending sidewall portion and an outwardly extending flange portion and is provided with a height to diameter ratio of from about 0.1 to about 0.16 and wherein said deep dish disposable container is provided with excess circumferential paperboard in suitable amounts to provide uniformity and strength to said deep dish disposable container, said excess circumferential paperboard forming a plurality of circumferentially spaced, radially extending densified regions in said sidewall and flange portions formed from a plurality of paperboard layers reformed into substantially integrated fibrous structures with a thickness generally equal to adjacent areas of the sidewall and flange portions; and

d) removing said deep dish disposable container from said heated pressware die set.

40. The method according to Claim 39, wherein said radially scored paperboard blank
5 has a basis weight of from about 140 lbs. to about 250 lbs. per 3000 square foot ream.

41. The method according to Claim 40, wherein said radially scored paperboard blank
10 has a basis weight from about 175 lbs. to about 225 lbs. per 3000 square foot ream.

42. The method according to Claim 39, wherein said paperboard blank is scored
utilizing a press provided with a plurality of opposing rules and channels wherein
the channels are wider than the rule widths by about 2 paperboard thicknesses
15 such that U-shaped pleats are promoted in said deep dish disposable container.

43. The method according to Claim 39, wherein said radially scored paperboard blank
is positioned utilizing a plurality of rotating pin blank stops disposed at the
periphery of said pressware die set and substantially perpendicular thereto.
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44. The method according to Claim 39, wherein said radially scored paperboard blank
is provided with from about 60 to about 90 scores.

45. The method according to Claim 44, wherein said scores have a width of about
25 0.03 inches.

46. The method according to Claim 39, wherein said deep dish disposable container
has from about 0.015 inches to about 0.050 inches of excess paperboard per score
about its flange portion.

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47. The method according to Claim 39, wherein said deep dish disposable container has from about 50 percent to about 175 percent excess paperboard per score about its flange portion.

5 48. The method according to Claim 47, wherein said deep dish disposable container has from about 90 percent to about 140 percent excess paperboard per score about its flange portion.

10 49. The method according to Claim 48, wherein said deep dish disposable container has about 100 percent excess paperboard per score about its flange portion.

15 50. A deep dish disposable container formed of paper including a substantially planar bottom portion, an upwardly extending sidewall integrally formed with said substantially planar bottom portion and a flanged portion projecting outwardly from the upper extremity of said sidewall portion, wherein said upwardly extending sidewall defines an angle of from about 10° to about 40° from a vertical perpendicular to said substantially planar bottom portion and said outwardly projecting flange portion defines an angle of from about -10° to about $+15^{\circ}$ with a horizontal parallel to said substantially planar bottom portion and wherein further, said deep dish disposable container has a height to diameter ratio of from about 0.1 to about 0.16.

20 51. The deep dish disposable container, according to Claim 50, wherein said deep dish disposable container has a height to diameter ratio of from about 0.125 to about 25 0.135.

52. The deep dish disposable container according to Claim 50, wherein said upwardly extending sidewall defines an angle of about 30° from a vertical perpendicular to said substantially planar bottom portion.

5 53. The deep dish disposable container according to Claim 52, wherein said outwardly projecting flange portion defines an angle of about 5° with a horizontal parallel to said substantially planar bottom portion.

10 54. The deep dish disposable container according to Claim 50, wherein said substantially planar bottom portion is joined to said upwardly extending sidewall by way of a first arcuate transition section defining a first radius of curvature, wherein the ratio of said first radius of curvature to the diameter of said deep dish disposable container is from about 0.035 to about 0.075.

15 55. The deep dish disposable container according to Claim 54, wherein the ratio of said first radius of curvature to the diameter of said deep dish disposable container is about 0.05.

20 56. The deep dish disposable container according to Claim 54, wherein said upwardly extending sidewall is joined to said flange portion by a second arcuate transition section defining a second radius of curvature wherein the ratio of said second radius of curvature to the diameter of said deep dish disposable container is from about 0.015 to about 0.045.

25 57. The deep dish disposable container according to Claim 50, further comprising a lip portion joined to said flange portion and extending downwardly therefrom.

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58. The deep dish disposable container according to Claim 50, wherein said deep dish disposable container has a diameter between about 9 and about 10 inches and height from about 1 to about 1.5 inches.

59. The deep dish disposable container according to Claim 50, formed from a radially scored, substantially planar paperboard blank, wherein said container has a substantial excess of paperboard per score such that during forming, said upwardly extending sidewall and said flange portions are provided with a plurality of circumferentially spaced, radially extending densified regions formed from a plurality of paperboard layers reformed into substantially integrated fibrous structures generally inseparable into their constituent layers having a thickness generally equal to adjacent areas of the sidewall and flange portions.

60. The deep dish disposable container according to Claim 59, wherein said radially scored paperboard blank has from about 60 to about 90 radial scores.

61. The deep dish disposable container according to Claim 60, wherein the scores of said radially scored paperboard blank have a width of from about 0.01 inches to about 0.04 inches.

62. The deep dish disposable container according to Claim 59, wherein the scores of said radially scored paperboard blank have a width of from about 0.01 inches to about 0.04 inches.

63. The deep dish disposable container according to Claim 62, wherein the scores of said radially scored paperboard blank have a width of about 0.03 inches.

64. The deep dish disposable container according to Claim 59, wherein said container has from about 0.015 inches to about 0.05 inches excess paperboard per score about said flange portion.
- 5 65. The deep dish disposable container according to Claim 64, wherein said container has from about 0.025 inches to about 0.04 inches excess paperboard per score about said flange portion.
- 10 66. The deep dish disposable container according to Claim 59, wherein said container has from about 50 percent to about 175 percent excess paperboard per score about said flange portion.
- 15 67. The deep dish disposable container according to Claim 59, wherein said container has from about 90 percent to about 140 percent excess paperboard per score about said flange portion.
- 20 68. The deep dish disposable container according to Claim 67, wherein said container has about 100 percent excess paperboard per score about said flange portion.
- 20 69. The deep dish disposable container according to Claim 59, wherein said deep dish disposable container has a height to diameter ratio of from about 0.125 to about 0.135.
- 25 70. The deep dish disposable container according to Claim 59, wherein the scores of the paperboard blank extend from the upper portion of the sidewall downwardly over at least about 50 percent of the height of the sidewall and terminate at a level substantially above said substantially planar bottom portion of said deep dish disposable container.

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71. The deep dish disposable container according to Claim 59, wherein the scores in the paperboard blank extend from the upper portion of the sidewall downwardly over at least about 75 percent of the height of the sidewall and terminate at a level substantially above said substantially planar bottom portion of said deep dish disposable container.

72. A rigid and strong deep dish disposable container prepared from a radially scored, substantially planar paperboard blank, the container having a substantially planar bottom portion, an upwardly extending sidewall portion, an outwardly extending flange portion, and a lip downwardly extending therefrom, at least one of said upwardly extending sidewall portions and said outwardly extending flange portions being provided with a plurality of circumferentially spaced radially extending densified regions formed from two to three layers of paperboard reformed into substantially integrated fibrous structures generally inseparable into their constituent layers having a thickness generally equal to adjacent areas of the sidewall or flange portions, wherein the ratio of the height to diameter of said container is from at least about 0.1 to about 0.16, the ratio of the length of said downwardly extending lip to the diameter of said deep dish disposable container is from about 0.010 to about 0.030 and wherein said densified regions extend over a profile distance corresponding to at least about 50 percent of the length of the scores of the paperboard blank from which said container is formed.

73. The deep dish disposable container according to Claim 72, wherein said densified regions extend over a profile distance corresponding to at least about 75 percent of the length of the scores from which the container is formed.

74. The deep dish disposable container according to Claim 72, wherein said container further comprises a lip portion joined to said flange portion and extending downwardly therefrom.

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75. The deep dish disposable container according to Claim 72, wherein said radially scored paperboard blank has from about 50 to about 100 radial scores.
- 5 76. The deep dish disposable container according to Claim 75, wherein said radially scored paperboard blank has from about 60 to about 90 radial scores.
77. The deep dish disposable container according to Claim 76, wherein said radially scored paperboard blank has about 75 radial scores.
- 10 78. The deep dish disposable container according to Claim 75, wherein the scores of said radially scored paperboard blank have a width of from about 0.01 inches to about 0.05 inches.
- 15 79. The deep dish disposable container according to Claim 78, wherein the scores of said radially scored paperboard blank have a width of about 0.03 inches.
80. The deep dish disposable container according to Claim 79, wherein said container has from about 0.015 inches to about 0.05 inches excess paperboard per score about said flange portion.
- 20 81. The deep dish disposable container according to Claim 80, wherein said container has from about 0.025 inches to about 0.04 inches excess paperboard per score about said flange portion.
- 25 82. The deep dish disposable container according to Claim 72, wherein said container has from about 50 percent to about 175 percent excess paperboard per score about said flange portion.

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83. The deep dish disposable container according to Claim 82, wherein said container has from about 90 percent to about 140 percent excess paperboard per score about said flange portion.

5 84. The deep dish disposable container according to Claim 83, wherein said container has about 100 percent excess paperboard per score about said flange portion.

85. The deep dish disposable container according to Claim 72, wherein said deep dish disposable container has a height to diameter ratio of from about 0.125 to about
10 0.135.

86. The deep dish disposable container according to Claim 72, wherein the scores in the paperboard blank extend from the upper portion of the sidewall downwardly over at least about 75 percent of the height of the sidewall and terminate at a level
15 substantially above said substantially planar bottom portion of said deep dish disposable container.

87. A deep dish disposable container formed of a thermoplastic composition
including a substantially planar bottom portion, an upwardly extending sidewall
20 integrally formed with said substantially planar bottom portion and a flanged
portion projecting outwardly from the upper extremity of said sidewall portion,
wherein said upwardly extending sidewall defines an angle of from about 10° to
about 40° from a vertical perpendicular to said substantially planar bottom portion
and said outwardly projecting flange portion defines an angle of from about -10°
25 to about +15° with a horizontal parallel to said substantially planar bottom portion
and wherein further, said deep dish disposable container has a height to diameter
ratio of from about 0.1 to about 0.16.

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88. The deep dish disposable container according to Claim 87, wherein said deep dish disposable container has a height to diameter ratio of from about 0.125 to about 0.135.

5 89. The deep dish disposable container according to Claim 87, wherein said upwardly extending sidewall defines an angle of about 30° from a vertical perpendicular to said substantially planar bottom portion.

10 90. The deep dish disposable container according to Claim 89, wherein said outwardly projecting flange portion defines an angle of about 5° with a horizontal parallel to said substantially planar bottom portion.

15 91. The deep dish disposable container according to Claim 87, wherein said substantially planar bottom portion is joined to said upwardly extending sidewall by way of a first arcuate transition section defining a first radius of curvature, wherein the ratio of said first radius of curvature to the diameter of said deep dish disposable container is from about 0.035 to about 0.075.

20 92. The deep dish disposable container according to Claim 91, wherein said upwardly extending sidewall is joined to said flange portion by a second arcuate transition section defining a second radius of curvature wherein the ratio of said second radius of curvature to the diameter of said deep dish disposable container is from about 0.015 to about 0.045.

25 93. The deep dish disposable container according to Claim 87, further comprising a lip portion joined to said flange portion and extending downwardly therefrom.

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94. The deep dish disposable container according to Claim 87, fabricated from a thermoplastic material by way of a technique selected from the group consisting of injection molding, injection blow molding, injection stretch molding and composite injection molding.

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95. The deep dish disposable container according to Claim 87, formed from a foamed polymeric material.

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96. The deep dish disposable container according to Claim 87, formed from a sheet of thermoplastic material.

97. The deep dish disposable container according to Claim 87, thermoformed, thermoformed by the application of vacuum or thermoformed by a combination of vacuum and pressure.

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98. The deep dish disposable container according to Claim 97, thermoformed by the application of vacuum.

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99. The deep dish disposable container according to Claim 96, wherein said thermoplastic material is a foamed or solid polymeric material selected from the group consisting of: polyamides, polyacrylates, polysulfones, polyetherketones, polycarbonates, acrylics, polyphenylene sulfides, acetals, cellulosic polymers, polyetherimides, polyphenylene ethers or oxides, styrene-maleic anhydride copolymers, styrene-acrylonitrile copolymers, polyvinylchlorides and mixtures thereof.

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100. The deep dish disposable container of Claim 96, wherein said thermoplastic material comprises a foamed or solid polymeric material selected from the group

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consisting of: polyesters, polystyrenes, polypropylenes, polyethylenes and mixtures thereof.

5 101. The deep dish disposable container according to Claim 87, thermoformed from a mineral-filled polypropylene sheet.

10 102. The deep dish disposable container according to Claim 101, having a wall thickness from about 10 to about 80 mils and consists essentially of from about 40 to about 90 percent by weight of a polypropylene polymer, from about 10 to about 60 percent by weight of a mineral filler, from about 1 to about 15 percent by weight polyethylene, up to about 5 weight percent titanium dioxide and optionally including a basic organic or inorganic compound comprising the reaction product of an alkali metal or alkaline earth element with carbonates, phosphates, carboxylic acids as well as alkali metal and alkaline earth element
15 oxides, hydroxides, or silicates and basic metal oxides, including mixtures of silicon dioxide with one or more of the following oxides: magnesium oxide, calcium oxide, barium oxide, and mixtures thereof.

20 103. The deep dish disposable container according to Claim 87, having a wall caliper of from about 10 to about 50 mils.

104. The deep dish disposable container according to Claim 103, having a wall caliper of from about 15 to about 25 mils.

25 105. The deep dish disposable container according to Claim 61, wherein said mineral filler is mica.

106. The deep dish disposable container according to Claim 87, formed of a styrene polymer composition.

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107. The deep dish disposable container according to Claim 106, formed of polystyrene.

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